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TRAINING FOR A NEW WEAPON SYSTEM: PROPOSALS FOR INTRODUCING A NEW MARITIME PATROL AIRCRAFT WEAPON SYSTEM TO THE OPERATIONAL ACTIVE AND RESERVE FORCES.

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: B. P. Riley

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PREFACE

This paper was prepared in an attempt to lay out, in simple format, all the present aspects of maritime patrol aircraft aircrew training. The purpose of this effort is personal and intended to evaluate changes in the operational environment, the threat, technological improvements and expanding mission areas and then assess feasibility of the present training approach to future training opportunities. It is personal because this information will be of value in my next scheduled duty station.

In reviewing available material for this paper I found that surprising little attention, from the operational perspective, is devoted to training. More often than not the philosophy and direction of training is under the direction of system acquisition personnel. Too often the move to establish training standards arises after a system has been introduced to operational forces, without direction or clear statement of purpose. Then, a major training goal for a weapon system which was, initially, poorly or improperly introduced is to, as part of its recovery, break the habits of misuse which develop if a new system is not properly supported. In the future I hope we cn do better.

CHAPTER I

INTRODUCTION

Historically antisubmarine (ASW) has relied on advanced technology in order to detect, locate, track, attack and reattack (if required) an increasingly elusive enemy. In a period of real military cutbacks during which force planners seek to reduce not only hardware but also personnel expenses the desire to achieve an ASW system which performs, in place of a person, the analysis and decision making stages noted above represents a potentially significant dollar savings in manpower costs. Such an automated approach would eliminate a significant percentage of manpower costs necessary to support any weapon system. In the case of maritime patrol aircraft it could also markedly reduce high training costs in terms of flight time, sonobuoy expenditures and target operating expenses. In ASW training, as in all military disciplines, in order to gain only a minimum level of expertise, improve skills and retain proficiency on both the individual and ASW team level requires time and significant investments of money. Whether or not an automated system ever replaces man in the tactical loop is debatable. However as submarine targets get quieter and harder to locate and as the equipment necessary to locate them gets more complex; the amount of training required to successfully accomplish the mission will almost certainly increase. Trained ASW crews, be they in aviation squadrons, aboard ships or submarines require continual introductory and refresher training in equipment operation, data analysis, environmental factors affecting ASW and target operating procedures and characteristics.

This paper will examine new developments in antisubmarine warfare sensors, the changing threat relative to the Soviet Navy, the proliferation of

Third World diesel submarines and resultant requirement to develop new approaches to maritime patrol aircraft (MPA) training. Despite Department of Defense budgetary cutbacks, in fiscal year 1991 the Office of Naval Research experienced a 2.9% real growth in its science and technology budget with expected further funding increases in following fiscal years. In the FY-91 science and technology budget, 25% has been allocated to ASW related research including passive acoustic submarine detection, low frequency (acoustic) active detection and localization and shallow water ASW.1 In order to realize the full potential of these systems under development intensive operator training will be required.

CHAPTER II

BACKGROUND AND JUSTIFICATION OF THE PROBLEM

The history of introduction of new weapon systems to the MPA community is replete with examples of ASW sensors which failed to reach full potential because initial fleet training was either inadequate or non-existent. In the early 1980's the vertical line array difar (VLAD) sonobuoy was introduced to operational squadrons and immediately rejected by aircrews as unsatisfactory. VLAD sonobuoys were designed to eliminate background noise in the ocean in order to track a more distant submarine target. System designers failed to prepare a suitable introductory training program was prepared which would have advised aircrews that this particular sonobuoy was to be employed in specified environmental situations and was optimized to perform against certain passive frequency ranges related to specific submarine classes. Aircrews quickly developed mistrust of the sonobuoy and refused to employ it on operational missions. One result of this reluctance to use VLAD was a mismatch between the sonobuoy production base and inventory of buoys at operational locations.

Because of aircrews and mission planners refusal to employ VLAD other sonobuoys were expended at a higher than expected rates while excessive stockpiles of VLAD were accumulated. Almost a decade after its fleet introduction VLAD sonobuoy supply versus usage is still skewed because of aircrew distrust and misunderstanding of the sonobuoy's design capabilities due, in a large part, to inadequate initial operational level training.2

The UYS-1 Single Advanced Signal Processor (SASP) acoustic system in the P-3C Update III aircraft signalled a radical departure in concept and design from earlier airborne acoustic processors. Introduced to MPA forces in the mid-1980's it performed automatically many of the functions which had been done manually in earlier passive acoustic detection systems. Its improved passive frequency spectrum coverage also suggested it would be more effective against the quieter and less predictable, more sporadic, detection sources of modern Soviet submarines. Successful passive detection and tracking of older Soviet nuclear powered submarines was achieved through exploitation of their fairly stable narrow band frequencies. On newer submarines however, detection of these sources is much more difficult. Significant improvements in quieting and the variability of sound sources emitted by the submarine (as a function of its speed and operating mode) requires greater sensor flexibility. Recent operational experience has proven the value and potential of Update III but in the mid-1980's it was identified by aircrews as an unqualified failure. Once again this system was introduced to operational commands without benefit of trainers or a training curriculum. Mission planners , who were not identified as requiring Update III training, attempted to employ it in the same manner used in developing search patterns with older system. The results and dissatisfaction were predictable. Additionally operator acoustic analysis training curricula were not revised to reflect improvements inthe Soviet submarine quieting programs and variabilities in the newer submarine acoustic sources. Introduction of a complete ground curricuium and series of ground trainers lagged introduction of Update III by over two years.

Finally, the AN/APS-137 (V) Inverse Synthetic Aperture Radar (ISAR) was introduced in 1986. Designed primarily as an antisurface warfare (ASUW) sensor ISAR is capable of providing an operator with an electronic picture of the target he has selected. Through image interpretation, it is possible to locate and identify a specific unit amongst any number of ships from a range in excess of 100 miles. ISAR has truly revolutionized MPA's role in ASUW and made it an increasingly important mission. Although an unqualified success this system was also introduced with no training other than operator instruction in image analysis. From personal experience, aircrews received no training in system operation (including such simple tasks as turning the radar on, and were provided with no tactical guidance for employment. Everything was learned on a trial and error basis. As a result significant differences in tactics and employment philosophies developed between various commands. The result was poor employment and confusion as to system capabilities between squadrons operating ISAR and the battle groups they were tasked to support.

SUMMARY. Failure to develop effective training and trainers to parallel introduction of new sensors and weapon systems to MPA forces has resulted in less than optimum system employment during operations against the units they were intended to detect and track. What is required as a new system is introduced to operating forces is in effect a good, comprehensive "marketing" and training program.

CHAPTER III

THE CHALLENGE

The challenge is how to develop an instructional approach, within the basic MPA training command and on the operational level, which can support introduction of new, more technically complex equipment which are necessary if we are to be successful against a quieter, different and more challenging threat. For the purposes of examination in this paper the Update IV ASW avionics system designed for the P-3C aircraft and under development by Boeing Aerospace will be examined.

In July, 1987 Boeing won a contract to develop and produce the Update IV system. This new ASW system was to be installed in the Long Range Air Antisubmarine Warfare Capable Aircraft (LRAACA) and retrofitted into the P-3C Update II aircraft; built by Lockheed in the late 1970's and early 1980's. Lockheed won a contract in 1988 to produce LRAACA; now designated the P-7. In June 1990 the Navy terminated P-7 development when the contractor was unable to meet the 1600 nautical mile operational range specification with a four hour on station requirement. Because of additional weight in the aircraft design Lockheed maintained the contract specification could only be achieved if the aircraft unit price was markedly increased. Update IV development by Boeing continued despite canellation of P-7.

The Update IV is primarily an information management system. Extremely software intensive it is designed to simultaneously process up to four times as many sonobuoys as some of the present P-3C acoustic detection systems. It is built around a Distributed Processor/Display Generator Unit (DP/DGU). This allows quicker data processing, distribution of information from all aircraft sensors, communication systems and navigation equipment and allows for growth and expansion as new sensors are developed. The DP/DGU drives six identical tactical crew displays. This is one more position than the present P-3C tactical crew. Update IV is a radical departure from the older aircraft specialized crew station approach which required a significant amount of manual operation. In Update IV any operator can display and evaluate data from any aircraft sensor. The basic tactical crew layout will include one naval flight officer as a tactical coordinator, one naval flight officer assigned as a navigator and communicator, two enlisted naval aircrewmen operating the acoustic systems and two enlisted aircrewmen operating the non-acoustic systems (including radar, forward looking infrared, magnetic anomaly detection system and electronic support measure systems).3 Table I provides a listing of planned Update IV avionics systems now under development and is presented to illustrate the volume of equipment which must be mastered by each member of the tactical crew.

Whether Update IV ever makes it to full scale production is questionable in this period of major force revisions. Even though development continues a final decision as to full system production has not been reached. Regardless of whether the full system achieves maturity it is a certainty many of the components will be introduced to the operational forces. Therefore consideration still needs to be given to training requirements necessary to introduce whatever system comes along.

SUMMARY. Within the next five years maritime patrol aircraft forces will be receiving new ASW systems which are extremely software intensive. Aircraft tactical systems will be oriented so that any tactical crew member may display and analyze data from any sensor. These systems will require operators to have extended knowledge of submarine characteristics, effects of the environment and scientific principles which these components seek to exploit. In order to derive maximum benefit from this sort of system organization tactical crew members will be required to be familiar with many more aspects of ASW than the present "specialist" approach demands. This will require more intensive training. Despite these changes and introduction of a more complex system the challenge, as provided in guidance from the office of the Assistant Chief of Naval Operations (Air Warfare) is to establish a training program which requires no more training time or people than the present P-3C training curricula.

CHAPTER IV

CURRENT TRAINING

Maritime Patrol Aircraft aircrew training can be envisioned as occurring on two levels. The first level of training is completed in the fleet replacement squadron (FRS), as required, for a particular officer or enlisted designation. Second level training presupposes successful completion of the required FRS curriculum and is conducted under supervision of the commanding officer of an operational squadron once an individual reports to his final command. All levels of curriculum are approved by either the Chief of Naval Operations or the functional wing commander (Commander Patrol Wings Atlantic).

On an annual basis approximately 150 pilots, 130 naval flight officers, and 250 enlisted aircrewmen complete training en route to assignment in an Atlantic Fleet patrol squadron (VP).4 A similar number complete training in the Pacific Fleet. Each operational squadron (of the twenty active and thirteen reserve currently assigned to the Navy) has eleven assigned combat aircrews. The normal compliment of aircrewmen assigned to an operational squadron includes 33 pilots, 22 naval flight officers and 100 enlisted aircrewmen .these enlisted persons perform five specialized crew functions on the P-3C). At any time all aircrew personnel in a squadron are involved in some level of personal or combat aircrew training. Table II lists various P-3C crew positions and basic crew assignments.

Level one training is accomplished in the FRS. It provides instruction for first tour personnel and refresher training for previously qualified persons. Table III lists the various P-3 aircrew curricula and their course durations. FRS training for each position is accomplished using a building block approach. Persons under instruction are exposed to a particular system in their area of speciality through instructional textbooks and aircraft manuals. Reading is followed by traditional classroom lectures and hands on experience in either an available trainer or on a ground aircraft demonstration. Aircraft and trainer time employs a one to one student to instructor ratio and repitition of a procedure, operation or tactic is considered the most valuable part of the training process. Initial flight, navigational, sensor station and tactical training is accomplished in a diverse variety operational flight trainers (OFT's), weapon system trainers (WST's) or part task trainers. Table IV is a list of MPA trainers currently in use.

Training topics include relevant aircraft systems for the particular crew position, safety and emergency procedures, aircraft equipment operation, water survival, submarine characteristics, general and tactical oceanography, weapons employment training and basic ASW tactics. In the final stages of FRS training students are finally formed into a combat aircrew (CAC) and conduct tactical trainers and flights under instructor supervision. A crewman who successfully completes FRS training is considered minimally qualified to perform his duties as a member of a combat aircrew.

The second level of training is completed once an individual reports to an operational squadron and includes preparation for command wide evaluations, coordinated combat aircrew training and personal training. Command wide evaluations include minewarfare readiness certifications (MRCI's), a special weapons handling evolution and an operational readiness evaluation. Individual training involves both periodic personal qualifications and requirements to upgrade or qualify for a position on a combat aircrew. Table V lists P-3C crew postions and general qualification criteria.

Squadron level training also includes a series of combat aircrew qualification exercises. Exercises are classified as either basic, "once only" evolutions involving key crewmembers demonstrating a particular individual or crew coordinated skill or advanced qualification exercises which must be renewed on a periodic basis. Qualification exercises may generally be performed in a weapons system trainer (coupled or uncoupled to an operational flight trainer), during a scheduled ASW exercise or against a non-cooperative target on an operational mission. Presently there are eleven basic (required to be completed once a squadron tour) crew exercises and eight advanced exercises which require periodic renewal. Advanced exercises are designed to test a combat aircrew's proficiency in surveillance, antisubmarine warfare (against diesel or nuclear powered submarines), antisurface warfare and mine warfare. They are designed to be performed by a formed crew and in most cases qualification is not awarded unless the exercise is completed by the designated aircrew. Since crew stability is critical, if a crew member considered essential is transferred from his crew that entire crew must requalify in those exercises in which the departed person would have played a key role.

These crew qualification exercises, along with aircrew personnel individual qualifications (listed in Table VI) and other command grading criteria are used to develop both a crew and overall squadron readiness figure. This data is submitted by each operational squadron on a montnly basis as a squadron activity analysis report (AAR). AAR data is further translated into the standard Navy SORTS (Status of Resources and Training System) format used to assign overall "C" ratings and "C" ratings in mission areas (for instance antisubmarine and antisurface warfare).5

SUMMARY. Training is obviously a complex, manpower intensive process at the initial level in a fleet replacement squadron and the operational level. As botn personal qualifications and crew qualifications are used to determine a combat aircrew and command's readiness within the SORTS system careful monitoring and significant effort must be devoted to training. It is an asset intensive system which requires simulators and trainers, aircraft flight time, submarine targets, expendable sonobuoys and a significant amount of administration. New more complex systems will, unless changes are effected, require more training assets and more time to train.

In a report by VADM Robert Dunn, Assistant Chief of Naval Operations (Air Warfare) submitted to the Procurement and Military Nuclear Systems Subcommittee hearings of the Committee on Armed Services, House of Representatives on 11 May 1989 he wrote:

> "Training is a "force multiplier" which gives us the edge in readiness for combat. Training includes flight hours, classrooms, training support equipment, facilities and targets, adversary aircraft, simulators, training devices....Technology now allows simulators which virtually replicate real world threats and our own weapon system capabilities....The initial training in the operation and maintenance of complex weapon systems is best and most economically conducted first in simulators. It is absolutely

essential that training devices and simulators be funded parallel with new aircraft systems and modifications and they arrive before delivery of the first aircraft or modification, not after.6

CHAPTER V

CHANGING OPERATIONAL PERSPECTIVES

The present system of training and qualification exercises has been in effect since the early 1970's. In fact, it is a direct derivative of the training readiness process used in the P-2V Neptune (the land based ASW aircraft of the late 1940's through late 1960's), predecessor of the P-3 Orion. Through the years criteria in specific exercises have been modified and fine tuned as targets and operational scenarios have changed. As submarines have reduced their noise levels detection ranges in the simulators and actual open ocean training exercises have decreased proportionately. In fact, many crewmen voice opinions that targets simulated in weapon system trainers are frequently tougher than those encountered on operational missions. As submarines have changed their modes of operation the training side of the house within the MPA forces has been responsive and continually refined qualification exercises. The past emphasis in developing ASW capabilities for maritime patrol aircraft and other U.S. Navy ASW capable units focused on prosecuting nuclear submarines in the deep water, open ocean environment. Based on personal experience and close knowledge of MPA operations over the past twenty years I believe the training system has performed extraordinarily. This assertion is founded on results which include an unsurpassed aviation safety record and superlative performance against a wide range of modern Soviet submarines. Once reason the past training approach was so effective was that MPA aircrews routinely operated against submarines they would face in combat. Soviet submarine deployment patterns offered aircrews ready access to real world targets. Crews from both fleet replacement and operational squadrons trained on top of Soviet units. In fact, in retrospect, the difference between an operational and training flight was frequently blurred. The training system, at all levels, produced qualified aircrews prepared for their assigned missions.

In the last five years, however, three events have occurred which suggest that a major reassessment of the scope and emphasis of MPA training is required. These include radical changes in Soviet submarine deployment patterns and qualitative improvements in the Soviet submarine force, proliferation of non-nuclear powered submarines among the Third World navies and the increased role which patrol aircraft contribute to antisurface warfare. These changes in threat coupled with introduction of new technology and sensors requires a complete review of the present training approach.

SOVIET NAVAL OPERATIONS. Rear Admiral Thomas Brooks, Director of Naval Intelligence, before the Seapower, Strategic and Critical Materials Subcommittee of the House Armed Services Committee on Intelligence Issues on 14 March 1990 stated the Soviet Navy operational tempo continued its decline, which had begun in 1986, in 1989. Soviet naval units spent less time at sea, particularly in forward deployment areas and more time in port. The greatest cutback in deployments in 1989 was among nuclear powered attack and cruise missile submarines.7 Yet in spite of this cutback in operating tempo and a withdrawal from forward operating areas production of six submarine classes continues. Of these, three are nuclear attack classes, one class of nuclear powered ballistic missile submarines, one nuclear powered cruise missile and one diesel powered attack submarine. Rear Admiral Brooks cites improvements in submarine design and construction quality, growing technological sophistication and continuing vigorous submarine related research as critical and potentially threatening aspects of the Soviet submarine program.8

Changes in Soviet submarine operations has resulted in expanded areas of U.S. Navy MPA operations. An article in the September-October 1989 issue of Naval Aviation News offers insight into one area of ASW opeations which may require specially focused. Entitled "Survival in the Arctic" the article reviewed MPA participation in ICEX-89 and other Arctic area exercises. ICEX is an exercise designed to improve the U.S. Navy's knowledge of the Arctic region. The MPA portion of ICEX-89 included over 140 tactical and scientific mission flights into the Arctic region from Thule, Greenland. The purpose of the exercise was to assess the capability of MPA to track and attack Soviet submarines operating beneath the ice in the polar region. Participants included active and reserve U. S. Navy MPA squadrons and MPA aircraft from the Canadian Forces. The purpose of the exercise was to assess aircraft capabilities and gain insight into the performance of a variety of standard and developmental acoustic and nonacoustic sensors in the Arctic environment.9 The ICEX series of exercises continues along with MPA participation. If MPA missions into the Arctic expand, a whole series of training topics including Arctic survival, environmental affects of ice on accustic and nonacoutic signals, weapons employment and navigation will have to be developed. This entire area of Arctic operations is well beyond the scope of present aircraft system design. Aircraft tactical navigation systems, for example, were not designed to operate above 72 degrees latitude. There is no formal, comprehensive training program to support aircraft operations or aircraft maintenance in the Arctic region.

A 1988 article from "Morskoy Sbornik"(The Soviet Naval Digest) entitled "The Operational Robustness of Submarines in the Face of An Air Threat" provides insight into changes in Soviet philosophy on submarine warfare. It also suggests the U. S. should inject into its airborne ASW tactical training scenarios postulating operations in the face of a submarine launched anti-aircraft missile threat. The author defines operational robustness as the submarine's ability to perform its assigned mission in the face of enemy opposition. Operational robustness includes stealth, maneuverability, defensive capabilities, operational support and skills of the submarine's commanding officer.'10 The article concludes with a look into the future of airborne ASW:

> "The experience of past wars demonstrates that passive measures alone will not yield positive results in combat against aircraft....The most optimal variant of maintaining the operational robustness of submarines operating in remote areas under modern conditions...will be the combination of a high degree of stealth with adequate defensive capabilities in all dimensions and especially against the air threat." 11

A report by the Advisory Panel on Submarine and Antisubmarine Warfare to the House Armed Services Committee also suggests that training in exploitation of non traditional (acoustic and non-acoustic) sources of submarine vulnerability will have to be undertaken if the U. S. is to compensate for quieting in Soviet submarines. The committee noted that current ASW capability relies on sensor ability to detect the distinctive sounds generated by Soviet submarines. The advent of quiet nuclear and diesel powered Soviet submarines means that the Navy can no longer take a business as usual approach to submarine detection by developing only newer and more sensitive acoustic sensors.

> "For decades, our principle system for detecting and tracking Soviet submarines has been passive sonar....The era of relatively noisy submarines is beginning to draw to a close....New forms of non-nuclear propulsion--closed cycle diesels, sterling engines, fuel cells. etc.--are showing the potential for vastly greater submarine endurance...retaining its low acoustic signature...at a fraction of the cost of a

nuclear submarine....With the advent of quiet Soviet nuclear submarines and the prospect of even quieter non-nuclear submarines...of indeterminate nationality...the effectiveness of the narrow band passive sonar systems...is now being threatened....We are beginning to lose the traditional mainstay of our ASW capability."12

The report argues that new approaches to passive sonar, departure from old techniques, emphasis on detection of new, non-traditional acoustic sources and exploitation of non-acoustic vulnerabilities need to be developed. Some new technologies recommended include development of active sonar, particularly low frequency active and improvement of capabilites in the non-acoustic field (such as detection of internal waves left by a submarine as it passes through the water, detection by radar of the "Bernoulli hump" - a bulge left on the surface as a submarine forces water upward, wake turbulence detectors, detection of biological bioluminescence disturbed by passage of a submarine, radioactive and thermal detectors and employment of blue-green lasers).13 Despite development of new sensors we continue to emphasize instruction in submarine classification based on more traditional and disappearing acoustic signature components. The classroom curriculum for acoustic sensor station operators needs to reorient and expand its emphasis toward the more non-traditional components of a submarine's acoustic signature.

THIRD WORLD SUBMARINES. Paralleling significant improvements in the Soviet submarine is the already alluded to proliferation of non-nuclear and, perhaps eventually, nuclear powered submarines among Third World countries. According to an article "Conventional Submarines 1990" in the April, 1990 "Defense & Diplomacy" 38 world navies currently operate 505 conventionally powered submarines. Additionally at least six more nations are contemplating purchase or construction of non-nuclear powered submarines.14 An article in the "Asian Defence Journal" noted that:

> "forty years of consensus among front-line navies about the primary anti-submarine mission [of submarines] is breaking down, in favor of a greater emphasis on the more traditional anti-ship mission. The value of submarines controlling chokepoints and deterring the passage of powerful surface forces is now clear to developing navies and explains why they are making such strenuous efforts to acquire SSKs...."15

Accompanying the increase in the number on non-nuclear submarines is rapid development of several new air independent propulsion technologies (closed cycle diesel engines, Stirling external combustion engines, fuel cells and low powered nuclear reactors that charge a battery electric propulsion system) which will allow these vessels to operate with less constraints than those placed on diesel submarines.16 At least four countries are operating prototypes submarines with these systems. Once again, U.S. Navy submarine acoustic classification training, now focused almost exclusively on the Soviet Navy, needs to expand the scope of its instruction to vessels of other nations.

The ASW implications of proliferation of submarines to Third World navies supporting those missions discussed by "The Asian Defence Journal" article is contrary to the present ASW focus and training emphasis of the U. S. Navy. To counter such a threat will entail significantly more effort in development of training and tactics in order to build a capability against submarines in shallow water (normally classified as less than 100 fathoms). Of the eight advanced aircrew qualification exercises an MPA combat aircrew must complete, only one is dedicated to evaluating tactics which would be employed against a diesel submarine. None emphasizes shallow water ASW. Further, since the U.S. Navy has decommissioned its last diesel powered submarine, U. S. ASW forces no longer have conventionally powered targets to train against. Additionally most ASW training areas lie in relatively deep water and do not replicate the kind of environment in which a diesel submarine might operate.

Increased emphasis in developing oceanographic support for shallow water ASW will be required. This will in turn lead to a requirement for more training in shallow water tactical oceanography in order to exploit non-traditional acoustic sources that are vulnerable (and exploitable) in this environment. Increased emphasis will also have to be placed on development and employment of non-acoustic sensors. The shallow water ASW scenarios possible in the Third World are radically different from those that most U.S. Navy ASW units have trained for.

ANTISURFACE WARFARE. In 1986 MPA forces received the first APS-137 (V) Inverse Synthetic Aperture Radar (ISAR). As noted earlier ISAR provides an operator with the position of a target along with an electronic image of the vessel being interrogated. It is possible to identify, with a high degree of confidence, a specific vessel, at great range, from amongst a large group of other surface contacts. This adds significant capability to any over the horizon targeting (OTH-T) problem and makes ISAR equipped aircraft a critical asset to any antisurface warfare force. P-3's with ISAR, equipped with very precise navigation systems including global positioning systems and multiple radios can identify, accurately locate and coordinate multiple units in simultaneous attacks against hostile surface. Presently MPA crews train in coordinated surface strikes controlling both organic and non-organic battle group assets. For instance an attack training scenario which coordinates submarine launched cruise missiles, B-52's and battle group air assets is not unusual. P-3's were the first naval aircraft to receive the Harpoon cruise missile in 1979. Now with the addition of ISAR as a targeting sensor the role of this aircraft in any ASUW campaign will markedly increase.

In a yet to be published article submitted to the Association of Naval Aviation the surveillance role of ISAR equipped P-3's in Desert Storm/Desert Shield was recapped. P-3's in the Red Sea and Persian Gulf located and tracked over 10,000 surface contacts. After commencement of hostilities ISAR P-3's provided detection, tracking, targeting of Iraqi naval units and vectoring of armed attack aircraft to the target. "Of the 105 Iraqi units destroyed over half resulted from P-3 detections and vector/communication support."17

This is a significant ASUW capability backed up by demonstrated performance. There are however, within the MPA forces, no established training scenarios or standards which evaluate an aircrew's ability to properly employ ISAR. There is little to no standardization of tactics or communications in coordination of ISAR capable aircraft with battle groups they support. Of the eight advanced aircrew qualification exercises only one is dedicated to antisurface warfare. That one exercise emphasizes single aircraft targeting and Harpoon cruise missile attack with no requirement for coordination with other units. If other crises such as Desert Storm/Desert Shield are repeated no doubt ISAR capable aircraft will again be employed. Development of standardized programs to maximize this OTH-T capability are required.

SUMMARY. Improvements in Soviet submarine design and changes in submarine deployment patterns require new sensors and training in order to operate in geographic areas different from those of the past. Cases in point are the Arctic environment and shallow water areas. The proliferation of non-nuclear powered submarines within the Third World requires development of new approaches to ASW tactics, oceanography and technology which is beyond the scope of traditional U.S. Navy and MPA areas of training and operations. Hearings on advanced Submarine Technology and Antisubmarine Warfare held before the Seapower and Strategic and Critical Materials Subcommittee and the Research and Development Subcommittee of the Committee on Armed Services of the House of Representatives in April, 1989 illustrate the limited focus of the past. The entire scope of these hearings was directed exclusively at the Soviet submarine threat and no mention was given to submarine proliferation within other navies. 18

Lessons learned in the Persian Gulf will increase future demands for surveillance and ASUW support by ISAR capable MPA. This skill combined with increasingly diverse varieties of ASW will put demands on aircrews to exploit more complex sensors in more demanding operational evironments. In "There is a Sub Threat" it is summed up clearly:

> "There is no cheap solution and panacea. ASW remains force intensive, requires advanced technology solutions, is very sensitive to the ocean environments and is highly reliant on tactics and training. ASW operations against modern nonnuclear submarines...under adverse operating conditions are potentially more demanding than operations against SSN's in the open ocean....In contingency and limited objective operations no navy may be able to politically afford even a single point failure in ASW."19

CHAPTER VI

TRAINING ALTERNATIVES

The training challenge is to develop curricula to support initial training for new ASW systems and sensors and to widen the scope of advanced operational level training to account for changing missions and mission areas. This potentially more complex and difficult training needs to be accomplished without adding additional instructional time, people or costs to the training pipeline. For instance personnel responsible developing curricula for the Update IV system estimated the time to train an acoustic sensor operator would be about three times longer than that required to instruct an operator in the current models of the P-3C. This is because of the increased range of functions the new UYS-2 will perform and because of the amount of software which must be mastered in order to properly employ the system.

A comprehensive strategy which incorporates both initial and operational fleet level training must be developed. It needs to consider not only active but also reserve force personnel. By FY-92 almost 50% of the Navy's P-3's will be in the Ready Reserves. The nature of reserve training with limited weekend drills and active duty time will make it difficult to effectively introduce personnel to new concepts.

Four alternatives recommend themselves to these challenges: employment of computer based training (also known as computer assisted instruction) at both the basic and operational levels; increased emphasis on simulation in weapon system trainers to compensate for potential shortages in flight hours, sonobuoys and target time; formation of fleet introduction FIT teams to oversee introduction of new sensors and expanded real world ASW/ASUW training which looks beyond the traditional open ocean areas of emphasis.

COMPUTER BASED TRAINING. Computer based training (CBT) also known as computer assisted instruction (CAI) is becoming a common instructional tool in all levels of training in all the military services. Navy experience with CBT began in 1979 when the concept was employed in developing courseware for the S-3A "Viking" carrier based ASW aircraft. Similar CBT programs for training were employed with the F/A-18 and F-14 programs.20 CBT is not necessarily replacing classroom instructors as much as it is supplementing or altering traditional instructional methods. There are three basic categories of computer aided instruction: textbook, simulation and stimulation. Textbook CAI uses computer terminals to supplement normal classroom textbooks through basic instruction with a PC. Little student computer interaction is provided other than to answer questions in standard test format. Simulation trainers replicate equipment operation through software generated displays. An interactive computer simulation may teach a student how to operate an inertial navigation set. Stimulation trainers generate signals that are fed into actual equipment. Maintenance training on an aircraft hydraulic system may include computer stimulated signals to various system components.21

CBT systems allow training organizations to closely manage, track and schedule appropriate training for students on an individual basis. Most CBT systems report and record student progress. In some systems students cannot advance to the next level until proficiency is demonstrated in the current training unit. Student performance appears to have improved markedly under the CBT format. The Army's Basic Electronic Reinforcement Training program reported a rise in grades from a 50% average to 89% in weak students. Air Force Training Command surveys indicate considerably higher on the job performance levels for graduates of schools which use CBT over the levels of performance of personnel in identical specialties who completed normal classroom training.22

Review of Navy Update IV training plans indicates considerable reference to employment of CBT. However no discussion as to the proper mix of computer to classroom or flight training appears to have been considered. Additionally no consideration as to the levels or types of CBT is considered. In fact, "CBT" appears to be more of a management buzzword rather than a solid concept. Review of a variety of Navy documents and memoranda indicate that while CBT is the desired approach for training little or no consideration is given as to what the goal or purpose of the instruction should be. After considerable review of the Update IV system, its complexity and the changing threat it is apparent that the goal for an Update IV CBT oriented instructional format should be to provide training for a more complex aircraft system which will have to operate in expanded mission areas while incurring no additional training time. Most training plans reviewed were developed only with the intent of mastering system operations and were not balanced against the potential operational environment.

One document, the "VP-30 Update IV Training Plan" prepared in August, 1980 by the Atlantic Fleet P-3 Fleet Replacement Squadron suggested a more balanced approach for incorporation of CBT into normal training. Intended solely as a proposal for a basic FRS training program the VP-30 approach departs from the present P-3 training approach in the following ways:

1. It incorporates a "crew concept" in every conceivable area of training. Present training curricula emphasize individual positional training with formation of a crew only in the latter stages of training.

2. It considers partially, the necessity to shift areas of

operational emphasis. Specifically it gives equal weighting to ASW and ASUW training.

3. It would require 50 CBT work stations (for the course load of students noted earlier). Each work station would be interactive and capable of recording student performance. Each would be capable of accomodating textbook training using normal text and graphics, interactive training simulating various aircraft system operations and interactive training in Update IV software applications. Approximately 21% of the overall 19 week curriculum would be accomplished by computer based training. Inflight training would occupy 10% of the available training time and simulator training approximately 15% of the course. On board aircraft ground training would account for about 15% of available time with the remaining 40% involved in classroom instructor lectures. Present training approaches in the FRS have over 70% of available training time devoted to the classroom lectures with the remainder accomplished in flight or ground evolutions or in simulators.

4. Topics considered compatible with CBT include instruction in operation of almost all aircraft systems, normal and emergency aircraft procedures, sonobuoy types and performance, submarine characteristics, ship and aircraft recognition, weapon characteristics, oceanography and aerial mining procedures.

Qualified instructors who are knowledgable about both curriculum requirements and Update IV characteristics feel confident the CBT approach suggested by the FRS could provide more comprehensive training in less time and ensure a better product. Tables VII through IX highlight the VP-30 CBT approach for Update IV.23

Little consideration has been given to a CBT applications crew position upgrade training at the operational squadron level. In this case training for each position falls under the supervision of a squadron commanding officer. While each squadron uses the same approved curriculum and outline for positional and crew training; emphasis and subject matter approach are done at the discretion of the individual commanding officer. CBT, centrally managed and updated would allow each command to more accurately track the progress of the more than 150 aircrew personnel under training in each operational squadron. It would also, through standardization, ensure comprehensive, current training for each crewmember. Finally a single software driven computer station could replace the multitude of part task and table top trainers listed in Table IV.

For Reserve MPA forces computer based training could replace instructors now drawn from active forces or reserve personnel who are neither familiar with or current in new systems. CBT also could be available, on demand, on weekends or during normally unscheduled drill periods. The opportunity of a single CBT approach could also ensure standardization of training between active and reserve units. The goal of standardization, while obviously desirable, has not yet been achieved. The level of training and missions for which reserve forces train is more limited than that of active forces. Reserve forces compensate for fewer training opportunities with year of experience with the same equipment and against the same target. This past experience may not be as relevant to newer targets.

The risk of CBT seems not to lie in the quality of training but in the proliferation of non standardized hardware and software. As more communities move toward this media for training unless equipment is standardized it may become unsupportable after initial installation.24 Ultimately it may be easier and cheaper to purchase a new CBT system than to update one already in use. The risks of proliferation are already demonstrated by the just noted. Although each trainer can provide excellent instruction there is now no comprehensive strategy to synchronize the benefits of each individual trainer. For instance in the current system there is no overall strategy which attempts to integrate all of the trainers noted in Table III into an overall training plan. Better coordination needs to be achieved. An additional lesson learned from the S-3 and F/A-18 communities is to purchase a system from a manufacturer that will most likely remain in the CBT market for a number of years and be able to support its product. Finally, adoptation of a software package that is easily modifiable is a must in order to accomodation actual weapon system modifications is required. Many persons feel an all CBT approach may be a means of decreasing training time, producing a better product and cutting back on instructors. In aviation and in most disciplines this over reliance on CBT is probably a naive approach. What is required is a balanced approach whcih integrates CBT with other training disciplines.

SIMULATOR DEVELOPMENT. MPA forces have made aggressive use of simulators for the past twenty years. Presently most simulators at MPA bases operate 16 hours per work day with a similar weekend operating schedule to support reserve drill weekends. Some of the advanced qualification exercises now required for combat aircrew certification may now be completed in a weapon system trainer. Over the years of simulator employment training coordinators have tried to quantify the proper balance between actual inflight and simulator training. During the early 1970's, with the introduction of the first simulators, the approach was to employ six operational flight trainer (OFT) periods for every four training flights. This was considered an excessive reliance on simulation and over time a one to one simulator to flight ratio has developed. With improvements in training simulation and decreases in available flight hours for training a reexamination of the mix and a swing toward more simulation may be required. Determination of the proper simulator-flight balance can only be achieved through close observation of a control group of personnel under instruction. Side by side comparisons of two groups trained through different approaches and additional reliance on simulation should be considered.

Tactical training in weapon system trainers may be one area where even more cost savings and improved crew proficiency may be realized. Improved target and environmental simulation offers to compensate for cutbacks in Soviet submarine deployments and the resultant loss of "real world" targets. New simulators allow close instructor monitoring of individual and entire crew performance, offer excellent and immediate crew feedback and can be used to develop real world mission scenarios. Most importantly new weapon system trainers offer the opportunity to refine combat aircrew coordination skills. This skill in crew coordination, although somewhat basic, is absolutely essential for successful prosecution of new construction (and significantly quieter) submarines. Older (and louder) submarines were more forgiving in that their constant noise sources allowed aircrews greater room for error. Newer, quieter submarines with changing and more tenuous signatures require more decisive and aggressive prosecution coupled with more precise aircraft maneuvering in order to exactly position the airplane. These airmanship skills can be refined and their level of proficiency more accurately assessed in newer trainers. Additionally trainers save flight time and expendable sonobuoys. As an example: a sonobuoy (depending on type) may cost between

$150 and $500 with 20 to 30 expended on a typical training exercise. A common estimate for the cost of a simulated sonobuoy expended in a weapon system trainer is $0.05. Consideration should be given toward increasing the emphasis on ASW training in weapon system trainers.

FLEET INTRODUCTION TEAMS. Computer based training offers the opportunity to improve the quality of initial fleet replacement squadron and operational fleet squadron instruction. A critical problem, however, particularly during introduction of a new weapon system is ensuring continuity in training philosophy and approach between the various levels command. Typically there has been, in the MPA community, a disconnect between the FRS and operational squadron levels of instruction. One level of training does not necessarily build on the previous level. Ideally operational squadron individual and combat aircrew training should build upon initial FRS instruction.

Practice however has often been to the contrary. Introduction of the UYS-1 acoustic processor to the P-3C Update III afforded a particularly vivid example of a failure to design a comprehensive training program. "Lack of a 2F140 [trainer] had a significant impact on the ability of aircrews to develop crew coordination and to exercise the full capabilities of the P-3C U III systems."[25]

Even with bitter past experiences opportunities are always available to relearn the same old lessons. Within the next two months MPA forces will begin aircraft modifications to allow employment of the new Mark-50 advanced lightweight torpedo (ALWT). Mk-50 was designed under supervision of the Naval Sea Systems Command and MPA forces are the first naval aircraft to receive this new torpedo. Despite long lead times and preparation there has been no development of a training plan to oversee its operational force introduction.

No plan to support instruction in torpedo maintenance, weapons handling and loading, aircraft launch envelope or attack criteria was prepared. Now, in a last minute scramble, a quick syllabus to support a reasonably orderly introduction of this new weapon has just been completed.26

Utilization of a Fleet Introduction Team (FIT) to supervise all phases of the scheduled P-3C Update IV introduction is required and now being planned. In a draft instruction proposed to the Chief of Naval Operations by the Commander Patrol Wings Atlantic the purpose of the fleet introduction team "is to provide continuity, liaison, training, administrative assistance and related support to commands which are directly involved with the P-3C U IV weapon system, thereby effecting orderly and economic introduction of the integrated P-3C U IV into the fleet."27 The FIT team would monitor all phases of system introduction including operator and maintenance training, all levels of curriculum development and weapon system trainer introduction.

After reviewing the draft instruction it appears to have one critical flaw. Even though plans call for simultaneous introduction of Update IV to the active and reserve MPA forces the draft FIT team instruction focuses exclusively on the active force. Update IV, or almost any other new system will probably have parallel active and reserve implementation schedules. It is only logical that reserve integration into the FIT team be considered in order to avoid duplication of effort and, once again, ensure standardization.

EXPANDED ASW AND ASUW TRAINING. As noted earlier present aircrew qualification exercises have been essentially unchanged for the past twenty years. Now however the validity of ASW training emphasis which focused only on open ocean ASW against nuclear submarines needs to be challenged. The trend toward operational planning for shallow water scenarios against non-nuclear submarines should be reflected by paralleling emphasis in training. The ASW systems alluded to in the introduction now under development by the Chief of Naval Research to support shallow water ASW need to be considered in the preparing of long range training plans; particularly in developing simulation support.

In October, 1990 the U.S. Navy decommissioned its last diesel powered submarine the USS BLUEBACK (SS-581). Now with an all nuclear submarine force there are few opportunities to exercise against conventionally powered opponents. Further most U.S. ASW exercise areas are in relatively deep water. Aircrews therefore are unable to gain experience or appreciation for ASW operations in competition with the unique environmental features of the shallow water regime. Based on personal experience diesel submarines in shallow water can be formidable targets. More often than not the commanding officers of these submarines are intimately familiar with the environmental characteristics of thei· operating area and are exceptionally adept at exploiting them.

Efforts need to be made to increase exercise opportunities, particularly in shallow water, with allied submarines. Additionally the number of diesel scenario qualification exercises, which emphasize shallow water ASW problems, required for combat aircrew certification needs to be increased.

The lessons learned from the Persian Gulf War indicate that increased emphasis needs to be placed on ASUW training. To date there are no training standards established for employment of ISAR in an ASUW scenario. Acceptable criteria of training and tactical employment need to be identified so supported battle group commanders can be assured of competency and standard procedures by ISAR capable P-3's during the ASUW mission.

ASUW training requires critical reevaluation because in the present P-3C aircraft models all the sensors normally employed by MPA to supprt the ASUW mission are operated by one aircrewman. Sensor Station III is responsible for equipment operation and analysis of data from the P-3 radar, two ESM systems, an infrared detection set, a magnetic anomaly detection set (used in ASW) and an identification friend or foe (IFF) interrogator. Although not all systems would be employed simultaneously in an ASUW scenario a great deal of insight is not required to determine that for an aircrew to effectively perform its mission a Sensor Station III operator must be an expert on all his equipment and accurately evaluate information from many different sensors. Historically P-3 sensor operator training has emphasized the acoustic aspects of ASW and downplayed reliance on non-acoustic tactics. The equipment associated with non-acoustic ASW (rdar, ESM) is the same which is used in ASUW and more emphasis needs to be invested in training for the Sensor Station III operator.

Experience born out over time and relearned in the Persian Gulf War is that in the multi-surface contact, communication intense environment which characterizes ASUW operations operator overload is a real problem. Update IV with its universal displays will allow better distribution of sensor information among more crewmembers. It will also require a shift in training away from the specialist and toward the generalist. Each crewman in the present P-3C is a specialist in the operation of specific sensors. With future flexible systems the training emphasis will have to be on general aircrew training in order to more effectively employ a wider range of sensors in more operational scenarios.

SUMMARY. The present approach to combat aircrew training in the MPA community is too limited and inflexible. The community needs to assess it present approach in order to determine the validity of the present training approach in terms of expanding mission areas, changes in threat and more complex sensors. Budgetary constraints and system complexity should force a close examination of the training potential and opportunities presented by computer based training. If this approach is selected a clear determination of the training goal, needs to be made. Above all a comprehensive training strategy which considers the new operational environment needs to be developed to ensure efficient introduction of new ASW/ASUW systems. In other words the current fleet operators need to be involved.

CHAPTER VII

CONCLUSION

In order to realize the maximum potential of any new weapon system a comprehensive training plan which considers all phases of active and reserve force introduction and instruction needs to be developed. The Fleet Introduction Team (FIT) appears to be the best mechanism to achieve this goal. The scheduled introduction of the P-3C Update IV in the mid-1990's is coincidentally paralleled by major changes in the traditional ASW mission. The increased possibility of Arctic operations and proliferation of non-nuclear submarines in shallow water operating environments will require restructuring of the training emphasis in tactics, sensor employment and tactical oceanography.

The advent of quieter submarines, newer more complex sensors and more challenging operational environments presents a major training challenge. This coupled with budgetary imposed limits on training time hints of a requirement to increase employment of simulators and place greater reliance on computer based training. Based on experience, proficiency in ASW training is gained through not only simulation but actual operations. Therefore in employing new simulators and computer training a balance between these media and inflight proficiency needs to be established. No simple formula exists to determine what this balance is. Experience however indicates that with improved simulation and better tracking of individual and crew training greater reliance can be placed on simulation.

The post Cold War era offers expanded ASW and ASUW mission opportunities which will require both active and reserve MPA force participation. Even though the probability of a general conflict may be low the possiblity of limited objective wars in the Third World may be fairly high. To paraphrase an earlier quote by Rear Admiral Fitzgerald: 'the political consequences in a Third World conflict or crisis of the single point loss to a submarine or small combatant surface attack of a U.S. Navy warship could be disasterous.' In order to be able to defeat or deter any attack by a possible enemy our present aircrew training needs to prepare for those potential scenarios.

TABLE I

PLANNED EQUIPMENT FOR THE P-3C UPDATE IV

EQUIPMENT	NOMENCLATURE
Distributed processing/ display and control subsystem.	
-Distributed processor/ display generator unit (DP/DGU)	
-Color high resolution display(CHRD)	
-Pilot color high resolution display(PCHRD)	
-Programmable entry panel(PEP)	
-Trackball	
-Alphnumeric keyset	
-Numeric keyset	
-Acoustic interface unit	
-Mass memory unit	
-Hard copy recorder	
-Videotape recorder	
Acoustic subsystem	
-Sonobuoy receiver	AN/ARR-76
-Acoustic processor	AN/UYS-2
-Command transmitter	AN/ASA-76
-High density digital recorder	
Nonacoustic subsystem	
-Radar	AN/APS-137(V)
-Electronic suppot measures (ESM)	AN/ALR-66(V)5
-Infrared detection set (IRDS)	AN/AAS-36
-Magnetic anomaly detector (MAD)	AN/ASQ-81
-Identification friend or foe (IFF)	AN/APX-76
Navigation subsystem	
-Inertial navigation set (2) (INS)	LTN-72
-Omega/global positioning system	LTN-311
-Radar altimeter	AN/APN-194
-Barometric altimeter	AN/AAU-32
-Doppler radar	AN/APN-227
Communications subsystem	
-HF radio (2)	AN/ARC-161
-VHF/UHF radio	AN/ARC-182
-UHF radio (2)	AN/ARC-187
-SATCOM modem	
-Intercommunication	
-Cryptos	KG-54, KGV-11, KG-40,

	KY-58. KY-75.
Armament/ordnance subsystem -Harpoon set	AN/AWG-19

Note: In Update IV any member of the tactical crew will be able to access data from the acoustic, nonacoustic or navigation subsystems. Pilots and Naval Flight Officers will be able to access all data including communications and weapons subsystems.

TABLE II

P-3C AIRCRAFT AIRCREW POSITIONS/FUNCTIONS

PATROL PLANE COMMANDER (PPC)* - Designated pilot in command. Responsible for safe conduct of the mission and flight.

PATROL PLANE SECOND PILOT (PP2P) - Assigned as back up to the PPC. Normally in training for qualification as a PPC.

PATROL PLANE THIRD PILOT (PP3P) - Normally the least experienced pilot. In training for qualification as a PP2P and PPC.

PATROL PLANE TACTICAL COORDINATOR (PPTC)* - A qualified naval flight officer responsible for the tactical employment of the aircraft and direction of the tactical crew.

PATROL PLANE NAVIGATOR-COMMUNICATOR (PPNC) - A qualified naval flight officer responsible for safe navigation of the aircraft and management of the communication systems. Normally in training for qualification as a PPTC>

FLIGHT ENGINEER - A mid to senior level enlisted man selected from one of several aircraft maintenance ratings. Responsible for maintenance, preflight and inflight monitoring of aircraft systems.

SENSOR STATION ONE - A qualified acoustic sensor operator with an enlisted specialty rating of Aviation Antisubmarine Warfare Operator (AW). Responsible for passive acoustic analysis and employment of active acoustic systems.

SENSOR STATION TWO - Normally a junior AW in training for qualification as a sensor station one acoustic operator.

SENSOR STATION THREE - Also an AW. Trained in operation of aircraft nonacoustic systems (radar, MAD, ESM, infrared and IFF).

ORDNANCEMAN - An Aviation Ordnanceman (AO) assigned to load, download and launch sonobuoys and ordnance used in ASW. Also assigned to load various ASW and ASUW weapons.

INFLIGHT TECHNICIAN (IFT) - Selected from one of several aviation electronics ratings. IFT's are responsible for preflight and inflight repair of the P-3's entire avionics suite.

* Either the PPC or PPTC will be designated as MISSION COMMANDER responsible for the completion of the assigned mission.

TABLE III

FLEET REPLACEMENT SQUADRON AIRCREW COURSE LENGTHS

POSITION	CAT I (1)	CAT II (2)
pilot	19 weeks	16 weeks
naval flight officer	19 weeks	16 weeks
acoustic operator	19 weeks	n/a
non-acoustic operator	19 weeks	n/a
ordnanceman	13 weeks	n/a
flight engineer	19 weeks	n/a
flight engineer apprentice	12 weeks	n/a
inflight technician	26 weeks	n/a

1. CAT I (CATEGORY I) includes all first tour personnel
2. CAT II (CATEGORY II) includes personnel in refresher training.

TABLE III

MPA TRAINERS AND SIMULATORS

1. CREW TRAINING DEVICES.

a. 2F87F - Operational flight trainer (OFT). Provides coordinated instruction in pilot and flight engineer normal and emergency cockpit procedures. Employed in initial, follow on and proficiency flight training in a wide variety of simulated flight conditions and designated geographic areas. Can be coupled to operate with, or independent of, a tactics team trainer.

b. 2F87T - Weapon system trainer (WST). Provides coordinated instruction in tactical procedures against a wide variety of submarine and surface targets in an extensive range of environmental settings. Present models support the P-3C Update II. Employed in initial, follow on and proficiency training. Can be coupled to operate with the 2F87F.

c. 2F140 - Weapon system trainer (WST). A more advanced version of the 2F87T designed to simulate the P-3C Update III. Provides improved simulation and instructor flexibility.

2. PART TASK TRAINERS. These trainers are designed to provide initial, follow on and proficiency for one crew position.

a. 14B44 and 14B53A - Acoustic operator trainers. Provide analysis and equipment operation training for the P-3C Update II and Update III respectively.

b. 14B40A - Nonacoustic operator trainer. Provides nonacoustic operator analysis and equipment operation training.

c. 2C41 - Cockpit procedures trainer (CPT). Employed in initial training only to teach basic cockpit normal and emergency procedures.

d. DARTS - Deployable Acoustic Readiness Trainer. A portable tape recorder training system which can be used to provide on aircraft training in acoustic analysis and target identification. Employed primarily on the operational level for proficiency training.

3. TABLE TOP TRAINERS. Designed to be used either on an aircraft or in a classroom.

a. LEWT - Lightweight Electronic Warfare Trainer. Provides nonacoustic operators with training in analysis of electronic signals to ensure proficiency in operation of electron support measures (ESM) equipment.

b. EWOBT - Electronic Warfare On Board Operator Trainer. Provides nonacoustic operators in training on subjects ranging from basic radar propagation to specific platform radar characteristics.

c. HETA - Harpoon Engagement Trainer. Used to provide training in Harpoon cruise missile targeting.

d. PATT - Portable Aircrew Tabletop Trainer. Used to provide tactical coordinators with training in employment of basic airborne ASW tactics.

e. ISARTS - Inverse Synthetic Aperture Radar Training System. Designed to allow nonacoustic operators to gain and retain proficiency in the image interpretation skill required to operate the AN/APS-137 (V) radar.

TABLE V

OPERATIONAL SQUADRON LEVEL AIRCREW QUALIFICATION TRAINING REQUIREMENTS

PATROL PLANE COMMANDER - Maximum qualification time two years (six months for previously qualified pilots), 700 pilot hours including 100 hours in model, completion of a formal syllabus of instruction and individual qualifications. Qualification as a patrol plane second pilot.

PATROL PLANE SECOND PILOT - Maximum qualification time fifteen months and successful completion of the approve syllabus. Qualification as a patrol plane third pilot.

PATROL PLANE THIRD PILOT - Maximum qualification time six months, completion of an approved curriculum of flights, trainers and lectures. Successful completion of the fleet replacement squadron syllabus.

PATROL PLANE TACTICAL COORDINATOR - A formal syllabus of flights, weapon system trainers and lecture. Maximum allotted time for completion is twenty-four months. Prerequisite is qualification as a navigator-communicator.

PATROL PLANE NAVIGATOR-COMMUNICATOR - A formal syllabus of flights, weapon system trainers and lectures to be completed within an eight month period.

FLIGHT ENGINEER - Designated as an enlisted naval aircrewman. Complete the fleet replacement squadron (FRS) flight engineer curriculum. Complete approved squadron level curriculum within nine months and log a minimum of 100 hours of flight time.

INFLIGHT TECHNICIAN - Complete appropriate FRS training, attain designation as an enlisted naval aircrewman and complete approved squadron level curriculum within eighteen months.

SENSOR STATION I - Complete approved squadron level training curriculum within eighteen months. Attain designation as an enlisted naval aircrewman.

SENSOR STATION II - Complete the appropriate FRS training and complete squadron level within twelve months.

SENSOR STATION III - Complete appropriate nonacoustic FRS training, squadron level training, attain designation as an enlisted naval aircrewman and qualify within eighteen months of reporting to an operational squadron.

ORDNANCEMAN - Complete approved FRS curriculum, required weapons loading and handling schools and certifications, squadron level training and attain enlisted naval aircrewman designation. Qualify within eighteen months of reporting to an operational squadron.

TABLE VI

DESIGNATION/CURRENCY TRAINING REQUIRED FOR ALL AIRCREW PERSONNEL

TRAINING	FREQUENCY
Survival, Evasion, Resistance and Escape (SERE)	one time
Naval Aviation Physiology Training Program (NAPTP)	every four years
Naval Aviation Water Survival Training Program (NWASTP)	every four years
Observer Training	once per tour
Naval Air Training Operations Procedures and Standardization (NATOPS)	annually
Instrument Rating Qualifications (pilot & NFO)	annually

TABLE VII

"VP-30 UPDATE IV TRAINING PLAN"

TRAINING PHILOSOPHY

* CREW TRAINING
* BUILDING BLOCK APPROACH
* SYSTEM TESTING ONLY
* EQUAL ASUW AND ASW EMPHASIS
* MAXIMUM UTILIZATION OF FLIGHTS AND TRAINERS
* NO LONG GAPS BETWEEN TRAINING FLIGHTS
* COMPUTER BASED TRAINING
* MISSION VS SYSTEMS EMPHASIS

TABLE VIII

"VP-30 UPDATE IV TRAINING PLAN"

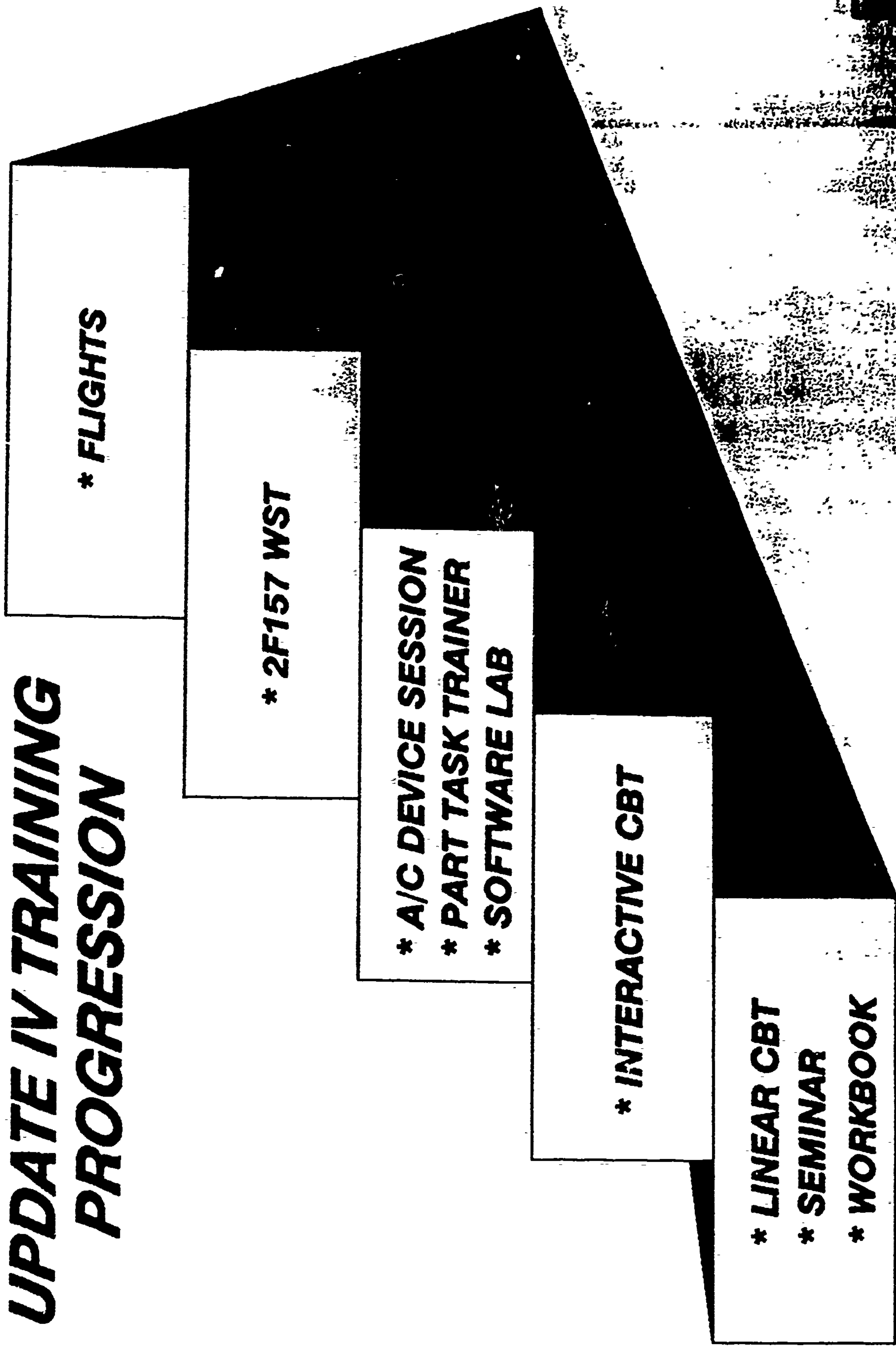
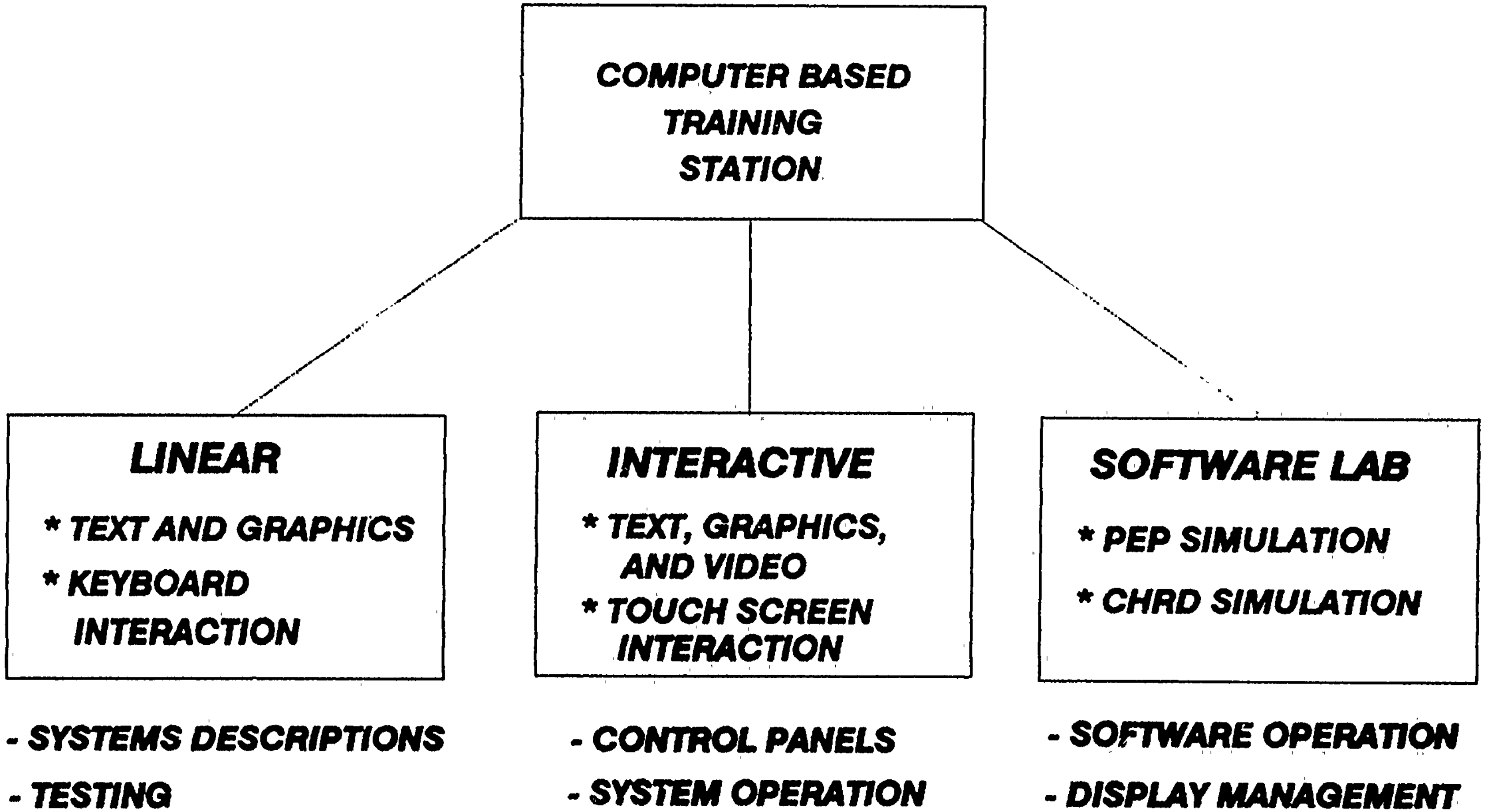


TABLE IX

"VP-30 UPDATE IV TRAINING PLAN"



COMPUTER BASED MEDIA OPTIONS

LIST OF ABBREVIATIONS

ADVANCED LIGHTWEIGHT TORPEDO....................................ALWT
ANTISUBMARINE WARFARE...ASW
ANTISURFACE WARFARE...ASUW
COMBAT AIRCREW..CAC
COMMANDER PATROL WINGS ATLANTIC.................................COMPATWINGSLANT
ELECTRONIC SUPPORT MEASURES.....................................ESM
FLEET INTRODUCTION TEAM...FIT
FLEET REPLACEMENT SQUADRON......................................FRS
FORWARD LOOKING INFRARED SYSTEM.................................FLIR
IDENTIFICATION FRIEND OR FOE...................................IFF
INFRARED DETECTION SET..IRDS
INVERSE SYNTHETIC APERTURE RADAR................................ISAR
MAGNETIC ANOMALY DETECTION SYSTEM...............................MAD
MARITIME PATROL AIRCRAFT..MPA
OFFICE OF THE CHIEF OF NAVAL OPERATIONS.........................OPNAV
OPERATIONAL FLIGHT TRAINER......................................OFT
PATROL SQUADRON...VP
WEAPON SYSTEM TRAINER...WST

NOTES

1. Joris Janssen Lok, "R & D Funds Raised Despite Cutbacks," Jane's Defence Weekly, 6 April 1991, p. 523.

2. Interview with CDR D. Miskill, USN, Training Officer, Commander Patrol Wings Atlantic, Naval Air Station, Brunswick, Maine, 3 May 1991.

3. "P-3 Update IV & LRAACA, U.S. Airborne ASW Assets for the 1990's," International Defense Review, Volume 22 2/1989, p. 214.

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